

18. An apparatus configured to measure a bio signal, the apparatus comprising:

- an electrode unit comprising electrodes that contact a surface of an examinee;
- an impedance measurer comprising a voltmeter and a current source, the current source inducing an internal impedance;
- a mode controller configured to control the impedance measurer to measure a first impedance value of the examinee while the impedance measurer is operating according to a first mode, and measure a second impedance value of the examinee while the impedance measurer is operating according to a second mode; and
- a bio impedance obtainer configured to obtain bio impedance of the examinee based on the first and second impedance values and the internal impedance of the current source.

19. The apparatus of claim **18**, wherein the electrode unit comprises a first electrode, a second electrode, a third electrode and a fourth electrode, and the mode controller is configured to control the impedance measurer such that the current source is connected between the first electrode and the fourth electrode, and the voltmeter is connected between the second electrode and the third electrode when the impedance measurer operates according to the first mode.

20. The apparatus of claim **19**, wherein the mode controller is configured to control the impedance measurer such that the current source is connected between the first electrode and the fourth electrode, and the voltmeter is connected between the second electrode and the third electrode, and

the first electrode and the second electrode are short-circuited, and the third electrode and the fourth electrode are short-circuited, when the impedance measurer operates according to the second mode.

21. The apparatus of claim **18**, wherein the bio impedance obtainer is configured to obtain the bio impedance by compensating for an effect of contact impedance between the electrodes and the surface of the examinee in the first and second impedance values by considering the internal impedance of the current source.

22. The apparatus of claim **21**, wherein the bio impedance obtainer is configured to obtain the bio impedance by using Equation 1:

$$Z_m = Z_{AP} \frac{(\beta + Z_i)(\beta + Z_s)}{Z_{AP}(2\beta + Z_i + Z_s) + Z_i Z_s} \quad \text{Equation 1}$$

where β is defined by Equation 2,

$$\beta = \frac{2}{\frac{1}{Z_{2P}} - \frac{1}{Z_i} - \frac{1}{Z_s}} \quad \text{Equation 2}$$

where Z_{AP} =a first impedance value, Z_{2P} =a second impedance value, Z_i =an input impedance value of the impedance measurer, and Z_s =the internal impedance of the current source.

23. The apparatus of claim **18**, wherein the impedance measurer further comprises:

a current source parallel impedance that is parallel-connected to the current source and which changes an effective value of the internal impedance of the current source.

24. The apparatus of claim **23**, wherein the current source parallel impedance has an impedance value that is less than the internal impedance of the current source.

25. The apparatus of claim **19**, wherein contact impedance values between the first, second, third and fourth electrodes and the surface of the examinee have different impedance values, respectively.

26. The apparatus of claim **25**, wherein the mode controller is configured to control the impedance measurer such that when the impedance measurer operates according to the second mode, the current source is connected between the second electrode and the fourth electrode, and the voltmeter is connected between the second electrode and the third electrode, and

the first electrode is electrically disconnected from the current source.

27. The apparatus of claim **26**, wherein the mode controller controls the impedance measurer to measure a third impedance value of the examinee when the impedance measurer operates according to a third mode, and

controls the impedance measurer such that when the impedance measurer operates according to the third mode, the current source is connected between the first electrode and the fourth electrode, and the voltmeter is connected between the first electrode and the third electrode, and

the second electrode is electrically disconnected from the current source.

28. The apparatus of claim **27**, wherein the mode controller controls the impedance measurer to measure a fourth impedance value of the examinee when the impedance measurer operates according to a fourth mode, and

controls the impedance measurer such that when the impedance measurer operates according to the fourth mode, the current source is connected between the first electrode and the fourth electrode, and the voltmeter is connected between the second electrode and the fourth electrode, and

the third electrode is electrically disconnected from the current source.

29. The apparatus of claim **28**, wherein the mode controller controls the impedance measurer to measure a fifth impedance value of the examinee when the impedance measurer operates according to a fifth mode, and

controls the impedance measurer such that when the impedance measurer operates according to the fifth mode, the current source is connected between the first electrode and the third electrode, and the voltmeter is connected between the second electrode and the third electrode, and

the fourth electrode is electrically disconnected from the current source.

30. The apparatus of claim **29**, wherein the bio impedance obtainer is configured to obtain the bio impedance by compensating for an effect of the contact impedance between the first, second, third and fourth electrodes and the surface of the examinee in the first, second, third, fourth and fifth impedance values.